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ABSTRACT

This presentation addresses the question of what language experiences are most appropriate for the academic instruction of children who do not speak English as a native language. The question is explored through a reanalysis of data gathered in a previous 6-year study that varied English and Tagalog instruction across grades one through six in 18 Philippino classrooms. It was concluded that (1) proficiency in English is directly related to the number of years in which it is used as the medium of classroom instruction, and (2) the average level of literacy in Tagalog is not closely related to the number of years in which it has been used as a medium of classroom instruction. Throughout the reanalysis of the Philippino data, methodological considerations which should be applied when choosing the unit of analysis, covariates, and variables for use in a multivariate analysis of covariance procedure are demonstrated. The conclusions of the original study were supported by the reanalysis of the data. On the basis of these results, it is recommended that English be used as the language of instruction for non-native speakers of English and that such instruction be accompanied by appropriate instruction in native language arts and culture. (Author/RH)

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Bilingual Education: When Should the Child Start?

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BILINGUAL EDUCATION: WHEN SHOULD THE CHILD START?

By W. F. Barker and Lita L. Schwartz

In 1954, the Supreme Court, through its decision in the case of Brown V. Topeka Board of Education, started a movement in education and social action that has led to continuing controversy. When the movement was painfully slow during its first decade, Lyndon Johnson gave presidential impetus to legislative social action designed to implement the Court's ruling. Extensive legislation was enacted to provide compensatory education for the culturally different, particularly blacks, to remediate difficulties it was anticipated they would have in the process of school integration. Five years later, Arthur Jensen averred that "Head Start" and other compensatory efforts had failed to alleviate deficiencies. That statement is still being hotly debated in both professional and lay circles.

A similar situation is now developing in the wake of bilingual education programs and a 1974 Supreme Court decision (Lau V. Nichol) affecting the education of Chinese children in San Francisco and ultimately that of other non-English-speaking children throughout the country. Columnists in the public press argued about the threat of bilingual education programs to the "melting pot concept (Rosenfeld), the inept manner in which the programs are managed (Shanker), and the value of ethnic studies (Glazer). Traditionally, all immigrants to the United States had to learn the English language. There was no anxiety about psychological effects on the

child, loss of ethnic identity, or academic failure. Today, these effects are sources of concern to the psychologist, the educator, the ethnic leader, the citizen, and the legislator. As a result, we now have a variety of approaches to bilingual education that can lead to the conclusion that all efforts are useless--"a plague on all your houses". The purpose of this paper is to examine one specific study in the context of other studies in the hope that such a negative conclusion can be avoided.

There are three basic approaches to educating children who do not speak English:

1. Traditional: Immerse the minority-language speaker in an English-speaking school environment with use of the native language neither taught nor permitted.

2. Ethnic-dominant: Use the minority language as the medium of instruction, with English taught as a second language (TESL programs) until sufficient fluency is gained to permit transition to an English-dominated classroom.

3. Compromise: Use of English as the medium of instruction with the native language arts and culture taught

as one subject area in the school day.

Questions are raised as to the choice between the second and third options on psychological and socio-political grounds as much as on educational reality. The first option is generally unacceptable today principally because it is perceived as denigration of the child's home culture.

II. LITERATURE REVIEW

Whorf has hypothesized that successful bilingualism depends upon being bicultural, or being able to view reality from two or more distinct cultural perspectives (1956). Reflecting this point of view is the practice of using the native language or vernacular as the basic language of instruction. Collison (1974), for example, reporting on Ghanian children who had had 6 years of study with English as the dominant language of instruction, noted that "...when English is the language of education, the majority of the experimental subjects were not able to exercise their conceptual potential. On the other hand, the vernaculars...were more fruitful media for enhancing the language-thought interaction" (p. 454). A report on 217 Federally-funded bilingual education demonstration projects similarly avers that in homes where the dominant language is other than English, "...the children profit most from the use of their mother tongue as

a medium of instruction and as a foundation for developing greater competence in English". (1973, p. 32). Manuel (1965) further postulates that use of the vernacular as the initial language of instruction may ease the transition from the culturally different home to the school situation for young children. Studies in Canada (1968), the American Southwest (1970), and elsewhere urge teaching in the native language initially, with oral English as part of the curriculum. The transition to English as the language of instruction may then take two to three years.

Disagreement with programs evolving from Wharf's hypothesis is based on studies that indicate that the degree of competence in English is positively correlated with the length of exposure of English. As a practical matter, moreover, in many non-Western countries, as well as in the United States, English is the language of instruction and/or textbooks in the secondary and higher education levels. To achieve sufficient facility in English to permit subject matter competence, it would seem imperative to have maximum exposure to English. This study will attempt to answer two questions: (1) What effect does the introduction of a foreign language as the medium of classroom instruction at various grade levels have upon future ability in the use of that language on achievement and language proficiency tests? And, (2) What effect does the varying grade level of introduction have upon the ability of the person to use the

native language? These are some of the questions which a little known study, the Philippine Language-Teaching Experiments (Davis, 1967), attempted to answer.

III. METHODS AND PROCEDURES

In this paper, an appropriate extension of the analysis as given by Davis will be presented. It will attempt to demonstrate some of the considerations which should be applied when choosing the unit of analysis, covariates, and variables for use in a multivariate analysis of covariance procedure. With the advent of the high speed electronic computer and the prolification of "canned" programs, the temptation on the part of research workers had been not only to use more variable and covariates, but also to use more sophisticated analysis techniques. While increased sophistication can be a good thing, extra care must be used to make sure that the data which are subject to analysis fulfill the assumption of the particular technique being employed. Without verification of assumptions, the high speed computer and sophisticated multivariate analysis techniques "...can only generate complicated garbage from simple trash (Tatsuoka, 1969)". One of the stated objects of Part II of Davis' experiment was...

> "to determine whether Tagalog-speaking children will display the same amount of achievement... at the end of Grade 6...if English and Tagalog

language arts are taught daily and if the medium of instruction is:

(a) English in Grades 1-6

(b) Tagalog in Grades 1-2 and English in Grades 3-6

(c) Tagalog in Grades 1-4 and English in Grades 5-6."

To obtain data relevant to this objective, eighteen classes of approximately fifty children each were formed. At least one class was formed from each of the following five socio-economic communities: urban, semi-urban, farming, fishing, and cottage industry. Three groups of six classes each were formed with at least one school from each of the five socio-economic communities. Further, Group 1 received treatment (a), Group 2 received treatment (b), and Group 3 received treatment (c). Children from each school were selected for the experimental class by arbitrarily assigning pupils at the predetermined interval to the experimental class from an alphabetical list of all entering pupils. One teacher from each school was selected per year to teach the experimental class on the basis of a Teacher-background index. (See Davis, 1967, for the details of the selection procedures, p. 8-12). The project was initiated in 1960 and ended in 1966.

The six covariates selected and used were: (1) chronological age in months as of June 1960; (2) days in school in Grades 1-6; (3) Pupil Socio-economic Index (sum for rating in 1960-1961 and 1965-1966; (4) Tagalog Picture-Vocabulary Test, (June, 1960); (5) English Proficiency Test, Form A, Part 2: Oral Expression (June, 1960); and, (6) Language Aptitude Test (June, 1960). Two other covariates, Teacher-background Index (sum for teachers of each pupil in Grades 1-6) and, School-facilities Index as of June, 1960, were measured but not used in the final analysis.

The seven variables selected and used in the final analysis were: (1) English Proficiency Test, Form E, Part 1: Listening Comprehension (April, 1966); (2) English Proficiency Test, Form E, Part 2: Reading Comprehension (April, 1966); (3) English Proficiency Test, Form E, Part 3: Mechanics of English (April, 1966); (4) English Proficiency Test, Form E, Part 4: Oral Expression (April, 1966); (5) English Language Test (April, 1966); (6) English Reading Test (April, 1966); and, (7) Tagalog Reading Test (April, 1966).

The analysis procedures employed consisted of a univariate analysis of covariance of each of the seven variables using the individual pupil as the unit of analysis in both cases. Each univariate analysis of covariance used the six covariates mentioned above to statistically adjust the individual's final scores in accordance

with the initial scores.

The results of this analysis can be seen in Table 1. (Davis Table 30, pp. 71-72)

TABLE 1

Raw and Adjusted Mean Scores On Language Tests with F-Ratios For Treatment Differences Among All Completed Cases in Grade Six

Variate	Difference	Group 1	Group 2	Group 3	F-ratio	DF
English Listening Comp.	Raw	9.01	8.07	7.06	39.21	2;573
	Adj.	9.35	7.73	7.07	49.11	2;566
English Reading Comp.	Raw	27.73	23.16	20.38	61.71	2;573
	Adj.	29.01	21.87	20.45	81.95	2;566
English Mech.	Raw	60.34	56.85	52.94	49.11	2;573
	Adj.	62.12	55.14	52.95	72.48	2;566
English Oral Express.	Raw	12.50	10.12	9.54	50.71	2;573
	Adj.	13.03	9.61	9.54	62.63	2;566
BPS English Language	Raw	62.77	58.75	56.43	27.48	2;573
	Adj.	64.56	57.03	56.44	44.20	2;566
BPS English Reading	Raw	55.96	49.65	45.05	54.70	2;573
	Adj.	57.74	47.86	45.14	70.51	2;566
BPS Tagalog Reading	Raw	85.34	84.71	84.57	2.12	2;573
	Adj.	85.91	84.14	84.58	6.93	2;566

Some of the conclusions reached as a result of the data presented "may be stated as: Proficiency in English is directly related to the number of years in which it is used as the medium of classroom

instruction". And "the average level of literacy in Tagalog is not closely related to the number of years in which it has been used as a medium of classroom instruction (Davis, 1967)". An important question which may be asked is: "Do there exist within the confines of the experimental situation other units, covariates, variables, and methods of analysis which might have been more germane to the practical question of second language instruction within the classroom setting?"

IV. THE RIZAL EXPERIMENT, PART TWO - RATIONAL FOR REANALYSIS

In this section, the units, covariates, variables, and method of analysis used in the Rizal Experiment, Part Two, will be discussed and another unit and method of analyzing the data will be suggested. It will be suggested that the appropriate unit of analysis should be the classroom mean, that the only covariate which should be employed with the English literacy tests is the Pupil Socio-economic Index, and that the analysis technique which should be used is: (1) a multivariate analysis of covariance for the English literacy tests and, (2) an univariate at analysis of variance for the Tagalog Reading Comprehension Test, 1966.

Two points will be considered in the choice of units for the Rizal Experiment, Part Two: (1) the random assignment of units to

different treatment conditions and, (2) the independence of possible interaction during the experimental period.

In the Rizal Experiment, Part Two, the three groups used were formed randomly from eighteen schools which were blocked on their socio-economic level with one classroom formed per school. The children were placed in that classroom on the basis of ransom selection from the children who enrolled in that school. This procedure does not accomplish the task of random assignment of units to treatments, if the individual pupil is considered the experimental unit. It does accomplish the desire goal of having the experimental units randomly assigned to treatments, if the classroom is considered the experimental unit. If the individual pupil is designated as the experimental unit, one must consider the fact that the treatment is administered to the classroom as a whole. It would then seem to be rather difficult to assume that any interaction of the units was an independent, random type of function. When the individual pupil is designated as the experimental unit and the treatments are administered to groups of units, classrooms, there exists the distinct possibility of systematic uncontrolled differential interaction. This problem can be solved by either teaching English to each child individually, which is rather impractical, or by designating the classroom as the experimental unit.

According to Peckham, Glass, and Hopkins (_____), the definition of a unit is:

> The experimental units are the smallest division of the collection of the experimental subjects which have been randomly assigned to the different conditions in the experiment and which have responded independently of each other for the duration of the experiment or which if allowed to interact during the experimental period, had the influence of all extraneous variables controlled through randomization.

Concerning the independence of possible interactions during the experimental period, Cox points out that:

> It is very desirable that the different experimental units should respond independently of one another, in the senses that there should be no way in which the treatment applied to one unit can affect the observation obtained in another unit, and that the occurrence of, say, an unusually high or low observation on one unit should have no effect on what is likely to occur on another unit....The precautions to be taken depend on the nature of the experiment,

> but they usually consist in physical isolation of the different units and, in particular, of the units receiving the same treatment (Cox, 1958).

The same point is made in Stanley's book, Improving Experimental Design and Statistical Analysis (1967, p. 183), and by Rath in his paper, "The Appropriate Experimental Unit" (1967). Furthermore,

> Steck (1966) tested the statistical hypothesis that the scores of students learning in a group have a smaller variance than do the scores of students learning in a one-to-one basis.... Steck found that the variance of scores of the students who learned in a group were significantly smaller than the variance of the scores of students who had learned individually (Rath, 1967).

Although the sample that Steck used was rather small, thirty children in each of the two experimental groups, the results seem to suggest that learning in a group is different from learning on a one-to-one basis. Finally, if the results of this study are to be generalized to the actual classroom situation in any meaningful way, it would seem that the analysis of the data should in some way reflect the situation as it really exists. In many schools, the teacher spends a large share of his or her effort in group instruction and activity.

Therefore, it would seem appropriate to use the classroom mean rather than the individual pupil scores as the unit of analysis.

Assuming that the appropriate unit of analysis has been chosen, the next step is to check the appropriateness of the assumption of the statistical procedure used. In this case, the assumptions of analysis of covariance must be examined. One of the assumptions of analysis of covariance is that within each treatment, scores on each of the variables have a linear regression on scores on each of the covariates and that the slope of the regression line across treatments is the same for each variable. It will be assumed that all of the regressions are of linear form. To test the quality of regression slopes across treatments, an F-test was used as given by Walker and Lev (1953), pp. 390-393). It was found that of all of the covariates only two, Pupil Socio-economic Index and Language Aptitude Test, had equal regression slopes across treatments for most of the variates. (See Table 2.) If a covariate is to be worth using, the regression slopes should not only be equal across treatments, but the common slope should also be different from zero. For example, if one inspects the covariate Language Aptitude in Table 2, it can be seen that, although for five of the seven variates a common slope exists for the three groups, there are five cells of the table without X's, therefore, it is not usable as a covariate in the analysis, because in all cases slopes are not significantly different from zero, i.e.

all cells contain zeros. In testing whether this was the case for the other covariates, the only covariate which was found to have a common slope different from zero was the Pupil Socio-economic Index. From these considerations, it would seem that the only legitimately usable covariate for the English literacy tests would be the Pupil Socio-economic Index.

TABLE 2

Test of Equality of Regression Slopes and of Zero Regression Slopes

$x = (B_1 \neq B_2 \neq B_3)$ $o = (B_w = 0.0)$

		COVARIATES							
		C.A. 1960	Attend.	Teacher Index	School Index	Socio econ.	Tagalog Vocab.	Eng. Oral	Lang. Apt.
VARIATES	English Listen.	o x	o x	o x	o x	x	o x	o x	o
	English Read.	o x	o x	o x	o x		o x	o x	o x
	English Mech.	o x	o x	o x	o x		o x	o x	o
	English Oral	o x	o x	o x	o	x	o	o	o
	BPS Eng. Lang.	o x	o x	o x	o x		o	o	o
	BPS Eng. Read.	o x	o x	o x	o x		o x	o x	o x
	BPS Tag. Read.	o x	o x	o x	o x	o x	o x	o x	o

Test of Equality Regression Slopes (Walker and Lev, 1953, p. 390).
Test of Zero Regression Slope (Dixon, 1967, DMDOIR, p. 218).

The choice of variables to be used in the statistical analysis should take into consideration the question(s) which the experiment attempts to answer and the type of analysis procedure which will be used. Since one of the goals of the Rizal Experiment was to measure the effect of differential beginning introduction of a second language as the medium of classroom instruction, it does not seem appropriate that one of the variables in the multivariate analysis of covariance used to help answer this question should be a test which measures the ability of subjects to use the original language. It would seem inappropriate because the subjects will in all likelihood use the original language in all daily contact outside the classroom. This usage plus daily instruction within class will probably lead to the development of proficiency. This uncontrolled variation should not be included within the first analysis as a variable since it is not really necessary in the answering of the first question being asked. Hence, it would seem that the inclusion of a variate to measure ability in the reading of Tagalog (Tagalog Reading Test, April, 1966) would be inappropriate.

The method of analysis which is being suggested for the first question is a multivariate analysis of covariance. This technique would seem necessary because of the high degree of intercorrelation between the variables (See Table 3) and because of the physical impossibility of completely controlling extraneous variance which the

statistical process of covariance analysis attempts to do. The high degree of intercorrelation of the variables would suggest that if one were to perform a series of univariate analysis of covariance, the conclusions that could be derived from these analysis procedures might be difficult to interpret successfully.

TABLE 3

Correlation Matrix of Variates
Using Class Means

	English Listen.	English Reading	English Mech.	Oral Express.	BPS Eng. Lang.	BPS Eng. Reading
English Listen. Comp.	1.0000	.9130	.9265	.8171	.8965	.9263
English Reading Comp.		1.0000	.9534	.8253	.8912	.9657
English Mech.			1.0000	.8274	.9127	.9530
Oral Espress.				1.0000	.8826	.7976
BPS English Lang.					1.0000	.9061
BPS English Reading						1.0000

Through the use of a multivariate analysis of covariance with its ability to include these high correlationships within the calculations, the interpretation of the resulting output would seem to be more clear

cut. To answer the second question, it would seem that the Tagalog Reading Test should be used for analysis.

A univariate analysis of variance is suggested as the method which should be used to answer question two.

V. RESULTS OF A REANALYSIS

The results of the reanalysis to answer the first question using the classroom mean as the unit; the Pupil Socio-economic Index as a covariate; and English Listening Comprehensive Test, English Reading Comprehension Test, English Mechanics Test, Oral Expression Test, BPS English Language Test, and BPS English Reading Test as variables in the multivariate analysis of covariance were that: (1) the mean of classroom means for the three groups on each of the variables arranged themselves in descending order corresponding to the decrease in the amount of time in which English was used as the medium of instruction in the classroom (See Table 4), and (2) the multivariate probability that the three groups were different because of a change fluctuation is less than 0.066 (See Table 5).

Table 4

Means, Standard Deviations and Adjusted Means* of Groups on Each English Literacy Variable

Variate		Group 1 Grades 1-6 (N = 6)	2 Grades 3-6 (N = 6)	3 Grades 5-6 (N = 6)
English	M	9.050	8.083	7.017
Listen.	SD	0.404	0.857	0.906
Comp.	ADJ .M	8.904	8.169	7.060
English	M	27.135	23,133	20.250
Reading	SD	3.097	3.140	2.010
Comp.	ADJ .M	26.567	23.466	20.500
English	M	59.983	56.950	52.750
Mech.	SD	2.428	3.830	2.573
	ADJ .M	59.443	57.267	52.989
Oral	M	12.383	10.217	9.483
Expres.	SD	2.267	2.099	1.083
	ADJ .M	12.008	10.437	9.655
BPS	M	62.500	58.917	56.217
English	SD	3.327	5.023	3.002
Lang.	ADJ .M	61.812	59.321	56.467
BPS	M	55.617	49.617	44.767
English	SD	4.187	5.476	4.056
Reading	ADJ .M	54.566	50.240	45.238

*Adjusted using the covariate Pupil Socio-economic Index.

TABLE 5

Multivariate Tests of Significance
Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P Less Than
1 through 2	2.207	12.000	18.000	0.063
2 through 2	0.964	5.000	9.500	0.485

Univariate F. Tests

Variable	F (2, 14)	Mean Sq.	P Less Than
Eng. Listen.	12.671	4.992	0.001
Eng. Reading	9.939	52.888	0.002
Eng. Mech.	9.034	62.754	0.003
Eng. Oral	3.283	8.167	0.068
BPS Eng. Lang.	3.591	41.245	0.055
BPS Eng. Read.	10.367	125.413	0.002

The results of the reanalysis to answer the second question using the classroom mean as the unit and the BPS Tagalog Reading Test (April, 1966) as the variable in a univariate analysis of variance were that: (1) the mean of classroom means for the three groups has no particular ordering (See Table 6) and, (2) the univariate probability that the three groups were different because of a chance fluctuation is less than 0.485 (See Table 7).

TABLE 6

Means and Standard Deviations of the Groups on the BPS Tagalog Reading Test

		Group 1 Grades 1-6 (N = 6)	2 Grades 3-6 (N = 6)	3 Grades 5-6 (N = 6)
BPS Tagalog Reading Test	M	85.483	84.767	84.567
	SD	0.624	1.648	1.549

TABLE 7

Univariate F-Test

F (2, 15)	Mean Sq.	P less than
0.760	1.395	0.485

VI. CONCLUSIONS

The conclusions which can be drawn from the reanalysis of the data are the same as those Davis reached in Philippine Language-Teaching Experiments: "Proficiency in English is directly related to the number of years in which it is used as the medium of classroom instruction". And, "the average level of literacy in Tagalog is not closely related to the number of years in which it has been used as the medium of classroom instruction". These conclusions would seem to be more strongly supported because the reanalysis

procedure reflected more accurately the actual experimental situation and the instruction of and to the classroom.

VII. DISCUSSION

The conclusions reached after an extended analysis of the data, despite the problems inherent to cross cultural comparison, would seem to be pertinent to educational experiments being carried out in the United States. It has been suggested by some (Baratz and Baratz, 1970; Labov, 1969) that the Black culture and language should be viewed and treated as a distinct experience, distinct from the main White cultural experience, but not as a deprived experience. One of the implications which has been suggested by this view is that Black children should receive their early education using "Black English" (Baratz, 1969). Although the use of the vernacular would be useful in promoting the child's self-concept and an appreciation of his cultural heritage, the results of this study would suggest that its use as the medium of classroom instruction might be detrimental to the child's future academic success. It would seem that for the child who does not use Standard English as the vernacular to achieve maximum future academic success and score high on achievement tests, which are administered in Standard English, the best approach would be to have the child use Standard English as the medium of classroom instruction as soon as possible. This does not mean that

the child's cultural heritage should be neglected in any way. Hence, it is recommended that the use of English as the language of instruction, accompanied by appropriate instruction in native language arts and culture (the Compromise option), offers an optimal experience necessary for future academic and career success in the present predominantly Standard English speaking culture.

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